# Wetland Restoration Projects

## Description

Wetlands are an important water quality management tool. About 80 percent of Clear Lake's natural shoreline has been lost to development. Restoring some of that shoreline can help to reestablish historical wetlands to improve water quality and other essential functions shared in the activity. Once students learn about these essential functions, educators facilitate a game demonstrating the threats to wetlands, the impacts of these threats, and local wetland restoration projects. Students will review these local wetland restoration projects for how the projects are restoring essential functions of wetlands, and ways people can get involved. Students can think about ways youth can get involved and use these local projects as examples for designing their own restoration projects.

## Objectives

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| **Student Objectives** | Understand the functions of wetlands and their threats. | Core Activity: Develop expertise |
| | Identify ways local organizations are restoring wetlands. | Key Youth Practice: Youth engage with complex socio ecological systems |
| **Educator Objectives** | Connect the local projects' opportunities for participation to students. | Key Educator Practice: Frame the work globally and locally |
| | Expand on ways youth can contribute to and develop restoration projects. | Key Educator Practice: Position youth as people who do science |

## Key Vocabulary

Wetland, function, habitat, shoreline, development, migrate, northern/southern hemisphere, restoration, surface water diversion, invasive species, development

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*This activity was adapted from the Watsonville Wetlands Watch Next Stop, Watsonville Lesson. See Module 2 References.*

# Instructions

## Time

1 hour, 30 minutes

## Materials

- A bag containing: Sponge, coffee filter, cup, sandbox toy mold, small basket.
- Printed and laminated wetland location cards (page 1-10). Note, in the space provided, there is an option to add place names in additional languages.
- Printed and laminated wetland restoration cards (page 11-14).
- Printed and laminated wetland threats cards (page 15-19).
- Printed migratory bird photos, enough for one per student. These should be cut in half, hole-punched twice at the top, with a string added so that a single bird photo becomes a necklace.
- Bag of dried kidney beans.
- Print copies of the Lake County News Lady of the Lake: Wondering About Wetlands article (pages 10-14).

## Getting Ready

- Draw a large sized hopscotch course containing 10 squares, each square about 3'x3'. Note: if you have a large group of students, you may consider setting up multiple courses. Each should have its own set of laminated restoration and threat cards.
- Place a laminated wetland location card in each square.
- Place a handful of dried kidney beans on each wetland location square.

## Facilitation

### Part One

Pull out each object from the bag one-by-one for students to view. Each object represents an essential function of a wetland habitat. For each object, have students share with a partner: "This object reminds me of a wetland because..." Emphasize that there are lots of right answers! Provide an example.

- Tea cup example: This teacup reminds me of a wetland because the wetlands also provide drinks for animals. This teacup reminds me of a wetland because the tea inside also helps me feel calm and quiet.

Once students have discussed their ideas for each of the objects, go through and describe how, in addition to all of the students' observations, each object represents wetland functions:

- Coffee filter: This reminds me of a wetland because wetland plants filter pollutants from the water.
- Teacup: This reminds me of a wetland because wetlands can hold a lot of water during floods.
- Sponge: This reminds me of a wetland because wetlands can store a lot of water underground.
- Sand box mold: This reminds me of a wetland because wetland plants hold together dirt, which can help the shoreline from washing away.
- Basket: This reminds me of a wetland because wetlands provide habitat for plants and animals that are important for people to continue traditions like basket-weaving.

## Part Two

Have students solve this math equation: Clear Lake has 100 miles of shoreline. Clear Lake has lost about 80% of its shoreline to development. How many miles of shoreline has been lost to development?

- Answer: 80 miles of shoreline

Ask students if they think developing this much shoreline helps or hurts the wetlands, and how might developing the shoreline impact the lake. Remind students about how when shoreline is developed, it often leads to the loss of tule.

Introduce to students that they will see how wetland threats, such as development, can impact birds. Have students select one of the five printed options of migratory birds of Clear Lake, and wear it like a necklace. As their selected bird, they will need to eat enough food to migrate from the southern to the northern hemisphere, represented by a start and finish line. On their way to the northern hemisphere, they will need to stop at a wetland, which is represented by each of the squares. Ask students, why do birds need to stop at a wetland?

- Answers: to eat, to rest

There, they will eat food by collecting one bean at each wetland square. They will need to collect five beans in order to successfully migrate. They do not have to stop at every wetland but they cannot go outside the course.

For the first round, all students should successfully migrate. For the second round, use a threat card to make it more difficult to migrate by destroying one of the wetlands, and remove the food availability on some of the wetland cards. The students may not set foot on the destroyed wetlands. If they do, they don't get enough food to survive the migration and sit out any future rounds. Continue adding threat cards and removing food in each round until all students fail to make the migration and collect enough food. Note: Try to "X" off the wetland squares in such a way that not all are destroyed but are so far apart students cannot make the jump.

In the final round, use the restoration cards to restore some wetland areas so students can collect enough beans for a successful migration.

## Reflection

### Part One

Debrief with your students:

- What happened? Why?
- How did you feel after each round? How tired were you?
- What did you notice about the food supply? Why do you think that happened?
- How do migrating birds depend on wetlands during their migration?
- Do you think a restored wetland area will benefit migratory birds?
- What do you think would happen to a species of birds if they lost all their migratory stops?

### Part Two

List the wetland threat cards and restoration cards students noticed while playing the game, and elaborate on each one. Allow 15 minutes for students to read the projects from the Lake County News Lady of the Lake: Wondering About Wetlands article (pages 10-14). In small groups, have students discuss:

- What wetland threat is each restoration project addressing?
    - Answer for the Middle Creek Flood Damage Reduction and Ecosystem Restoration Project: development
    - Answer for the Lake County Land Trust Wright Property Acquisition and Wetland Reconnection Project: pollution, surface water diversion
    - Answer for the Tule Lake Easement Project: surface water diversions
    - Answer for the Clark's Island Invasive Removal and Tule Restoration Project: invasive species removal, development
- How is each restoration project helping improve the wetland functions discussed earlier?
    - Answer for the Middle Creek Flood Damage Reduction and Ecosystem Restoration Project: a large area of protected land helps with flood risks
    - Answer for the Lake County Land Trust Wright Property Acquisition and Wetland Reconnection Project: reconnecting wetlands creates more habitat for traditional plants and animals
    - Answer for the Tule Lake Easement Project: removing a berm to restore natural flows helps replenish the groundwater
    - Answer for the Clark's Island Invasive Removal and Tule Restoration Project: removing invasives helps stabilize the soil and planting native species helps filter pollutants

Together, discuss their answers and revisit the same questions:

- Does developing the natural shoreline help or hurt the wetlands?

- How might developing the shoreline impact the lake?

With your students, look up the locations from the wetland restoration project cards on Google maps. Have students find the restoration project closest to where they live, or your classroom or setting. For the closest project, have students find one way the Lake County News Lady of the Lake: Wondering About Wetlands article (pages 10-14) suggests people can get involved. More ways youth can get involved in helping improve Clear Lake's wetlands and water quality can be brainstormed using the Our Clear Lake Stories activity.

## Optional Post-Activity

In small groups, students can design their own wetland restoration project, and present this to the whole group. Utilize the students' planning from the Power Mapping and Decision Makers activity if completed. Refer to the four restoration projects outlined in the Lake County News Lady of the Lake: Wondering About Wetlands article. Their plan should:

- Identify a location for the project using the US Fish and Wildlife Service: Wetland Mapper tool around Clear Lake.
- Identify at least one organization or agency that can help with the project.
- State at least one action the project would focus on to restore the wetland.

## Additional Uses and Modifications

Before the game, use the US Fish and Wildlife Service: Wetland Mapper tool to identify wetlands around Clear Lake to create your own wetland location cards.